1. A method for generating an exponential signal comprising:

scaling a stored signal to produce an increment signal;

adding the increment signal to the stored signal to obtain the exponential signal; and

replacing the stored signal with the exponential signal.

2. A method in accordance with claim 1, wherein the exponential signal has an initial value f_0 and further comprising initializing the stored exponential signal to the value f_0.

3. A method in accordance with claim 1, wherein the exponential signal has an initial value f_0, a final value f_p and a duration t_p and wherein scaling the stored exponential signal comprises multiplying the stored exponential signal by a scale factor $k = \left(\frac{f_p}{f_0}\right)^{\frac{T}{t_p}} - 1$ in each time step of duration T.

4. A method in accordance with claim 1, wherein scaling the stored exponential signal comprises shifting the stored exponential signal by S binary places in each time step of duration T.

5. A method in accordance with claim 4, wherein the exponential signal has a range with an initial value f_0 and a final value f_p, further comprising selecting the duration of the time step to be $T = t_p.\frac{\ln\left(1 \pm 2^{-S}\right)}{\ln\left(f_p\right) - \ln\left(f_0\right)}$.

6. A method in accordance with claim 5, further comprising:

dividing the exponential signal range into a plurality of sub-ranges; and

selecting at least one of a shift value S and a time step duration T for each sub-range.

7. A method in accordance with claim 1, wherein the exponential signal decreases with time and wherein scaling the stored exponential signal comprises:

negating the stored exponential signal and

shifting the stored exponential signal by S binary places in each time of duration T.

8. A method in accordance with claim 7, further comprising selecting the duration of the time step to be $T = t_p.\frac{\ln\left(1 - 2^{-S}\right)}{\ln\left(f_p\right) - \ln\left(f_0\right)}$, where f_0, is the initial value of the exponential signal and f_p is the final value of the exponential signal.

9. A method in accordance with claim 1, wherein scaling the stored exponential signal comprises scaling the stored exponential signal comprises shifting the stored

exponential value by S binary places, where S is determined from the maximum value of f_p / f_0, the minimum value of t_p and a minimum time step duration, where f_0 and f_p are the initial and final values of the exponential signal and t_p is the duration of the exponential signal.

10. A method in accordance with claim 1, performed in each of a plurality of time steps, further comprising counting the number of time steps until $N_{sweep} = t_p / T$ time steps of duration T have elapsed, where t_p is the duration of the exponential signal.

11. A method in accordance with claim 10, further comprising determining each time step by counting $N_{clock} = T / T_{clock}$ cycles of a system clock, where T_{clock} is the period of the system clock.

12. A method in accordance with claim 1, further comprising a user selecting an initial value f_0, a final value f_p and a duration t_p of the exponential signal.

13. A method in accordance with claim 1, further comprising controlling the frequency of a test signal with the exponential signal.

14. A method in accordance with claim 1, wherein the adding and replacing are performed in each of plurality of time steps of duration T/M and the scaling is performed only once in every M time steps, where M is greater than one.

15. A method in accordance with claim 14, wherein the exponential signal has an initial value f_0, a final value f_p and a duration t_p and wherein scaling the stored exponential signal comprises scaling the stored exponential signal by a scale factor k/M, where $k = \left(\frac{f_p}{f_0}\right)^{\frac{T}{t_p}} - 1$.

16. A method in accordance with claim 1, performed in each of a plurality of first time steps of duration T, further comprising, in each of a plurality of second time steps of duration T/M:

adding the exponential signal to a stored accumulated signal to obtain an accumulated signal;

providing the accumulated signal as output; and

replacing the stored accumulated signal with the accumulated signal.

17. A method in accordance with claim 16, wherein M is greater than one.

18. A method in accordance with claim 16, wherein the initial value of the stored exponential signal is $k.f_0/ M$, where f_0 is the initial value of the accumulated signal.

19. A method in accordance with claim 17, wherein the initial value of the stored accumulated signal is f_0.

20. A programmable gate array, programmed to operate in accordance with the method of claim 1.

21. An exponential signal generator comprising:

a first memory for storing a first exponential value;

a scale unit coupled to the first memory and operable to receive the first exponential value and produce a scaled value; and

a first adder coupled to the first memory and operable to add the first exponential value and the scaled value to produce a new first exponential value for storing in the first memory.

22. An exponential signal generator in accordance with claim 21, wherein the scale unit comprises a multiplier.

23. An exponential signal generator in accordance with claim 21, wherein the scale unit comprises a shifter.

24. An exponential signal generator in accordance with claim 23, wherein the scale unit further comprises a means for negating the first exponential value.

25. An exponential signal generator in accordance with claim 21, further comprising a state machine operable to control the first memory, the scale unit and the first adder.

26. An exponential signal generator in accordance with claim 25, further comprising:

a system clock; and

a clock counter operable to count cycles of the system clock, wherein the state machine is responsive the clock counter and controls the first adder to operate once in every time step of N_{clock} cycles of the system clock.

27. An exponential signal generator in accordance with claim 26, further comprising a segment counter operable to count time segments, wherein the state machine is responsive the segment counter and terminates operation of the exponential signal generator once N_{sweep} time segments have elapsed.

28. An exponential signal generator in accordance with claim 26, further comprising a first step counter operable to count time steps, wherein the state machine is responsive the first step counter and controls the scale unit to operate once in every M time steps.

29. An exponential signal generator in accordance with claim 28, further comprising a second step counter operable to count time steps, wherein the state machine is responsive the second step counter and terminates operation of the exponential signal generator once a specified number of time steps have elapsed.

30. An exponential signal generator in accordance with claim 25, further comprising:

a second memory for storing a second exponential value;

a second adder coupled to the second memory and operable to add the second exponential value and the first exponential value to produce a new second exponential value.

31. An exponential signal generator in accordance with claim 25, further comprising:

a system clock;

a clock counter operable to count cycles of the system clock;

a step counter operable to count time steps; and

wherein the state machine is responsive the clock counter and step counter and controls the second adder to operate once in every time step of N_{clock} cycles of the system clock and controls the first adder and scale unit to operate once in every M time steps.

32. An exponential signal generator in accordance with claim 30, further comprising a segment counter operable to count time segments, wherein the state machine is responsive the segment counter and terminates operation of the exponential signal generator once N_{sweep} time segments have elapsed.

33. An exponential signal generator in accordance with claim 21, further comprising: a test signal generator operable to produce a test signal having a frequency proportional to the first exponential value.

34. An exponential signal generator in accordance with claim 33, further comprising a user interface operable to receive an initial exponential value f_0, a final exponential value f_p and a duration of operation t_p of the exponential signal generator from a user.

35. An exponential signal generator comprising:

a means for retrieving an exponential value representative of an exponential signal;

means for scaling the exponential value by a scale factor to produce a scaled value;

means for calculating a sum of the exponential value and the scaled value; and

a means for storing the sum of the exponential value and the scaled value.

36. An exponential signal generator in accordance with claim 35, wherein the means for scaling the exponential value comprises a means for shifting the exponential value by *S* binary places.

37. An exponential signal generator in accordance with claim 36, wherein the means for scaling the exponential value further comprises a means for negating the exponential value.

38. An exponential signal generator in accordance with claim 36, further comprising a means for adjusting the rate of operation of the exponential signal generator.

39. An exponential signal generator in accordance with claim 38, wherein the means for adjusting the rate of operation of the exponential signal generator is dependent

upon the initial and final values of the exponential signal, the duration of the exponential signal and the shift value S.

40. An exponential signal generator in accordance with claim 36, wherein the means for scaling has a lower rate of operation than means for calculating.

41. An exponential signal generator in accordance with claim 35, further comprising a means for negating the scaled value.

42. An exponential signal generator in accordance with claim 35, further comprising a means for determining the scale factor dependent upon an initial exponential value f_0, a final exponential value f_p and a duration of operation t_p of the exponential signal generator.

43. An exponential signal generator in accordance with claim 42, wherein the scale factor is $k = \left(\frac{f_p}{f_0}\right)^{\frac{T}{t_p}} - 1$, wherein T is the step time of the exponential signal generator.

44. An exponential signal generator in accordance with claim 42, further comprising a means for generating a test signal having a frequency proportional to the exponential value.

45. An exponential signal generator in accordance with claim 42, further comprising a means for generating a test signal having a fundamental period proportional to the exponential value.